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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/683,750	10/10/2003	Weitao Jia	JEN-0052-D	2817

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CANTOR COLBURN, LLP
20 Church Street
22nd Floor
Hartford, CT 06103

EXAMINER	
WARTALOWICZ, PAUL A	

ART UNIT	PAPER NUMBER
1793	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

usptopatentmail@cantorcolburn.com

Office Action Summary	Application No.	Applicant(s)	
	10/683,750	JIA ET AL.	
	Examiner	Art Unit	
	PAUL A. WARTALOWICZ	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 February 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *37-39 and 41-64* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *37-39 and 41-64* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 2/27/09 have been fully considered but they are not persuasive.

Applicant argues that the colloidal particles have a unique elongated chain form, which are individually dispersed as in a sol and that individual nanoparticles of the sol are in the form of chains, which is nowhere taught by Zhang.

However, the claim is open to, and does not exclude, the interpretation that the amorphous silica nanoparticles are composed of smaller primary particles.

Additionally, applicant argues that the filler of Zhang contains a hardenable resin and that the clusters are not analogous to the chains of the present sol, but rather are produced form monodispersed spherical particles of a sol.

However, as recited in the rejection, one of ordinary skill in the art would recognize that in forming clusters, chains would inherently be formed in the cluster making process (Fig. 1). It appears that Zhang does teach an amorphous sol that includes secondary particles formed from primary particles. The claims do not require that the chains are not formed from discrete particles. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., chains are not formed from discrete particles) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Additionally, the claims do not require that the filler is formed from colloidal silica.In response to applicant's argument that the references fail to show certain features of applicant’s invention, it is noted that the features upon which applicant relies (i.e., colloidal silica) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant argues that it appears that it is Examiner's position that fumed silica of Zhang is inherently formed into chains.

However, it appears that Zhang teaches a silica sol starting material that is dried and heated such that clusters are formed, and there is the presence of at least some crystallinity. It appears that applicant is attempting to distinguish the instant invention from the prior art as to when the chains are formed and whether the chains are made up of discrete particles or not. However, the point in time in the reaction in which the chains are formed appear to be product by process steps.

It appears that the instantly claimed product by process is the same as that which is claimed (filler in the shape of chains exhibiting at least some crystallinity). When the examiner has found a substantially similar product as in the applied prior art, the burden of proof is shifted to the applicant to establish that their product is patentably distinct and not the examiner to show the same process as making. *In re Brown*. 173 USPQ 685 and *In re Fessman*, 180 USPQ 324.

One of ordinary skill in the art would recognize that in forming clusters, chains would inherently be formed in the cluster making process (Fig. 1). There does not appear to be any evidence on the record to the contrary of this assertion.

Additionally, it does not appear that the rejection relies on US 6193792 to Fague.

Applicant argues that both Windisch and Zhang teach against forming a crystalline structure and that crystallinity is to be avoided; specifically that Windisch states that "essentially no crystallinity is found after milling."

However, it appears that Zhang contemplates a cluster (which meets the limitation of chains, as described above) that exhibits a crystallinity index of less than 0.1 on a scale of 0.0-1.0 (Zhang, col. 14, lines 31-43). It appears that a crystallinity index of 0.099 is within the scope of these respective disclosures. Therefore, it appears that at least one crystalline phase is formed in the clusters of Zhang.

Additionally, Windisch states that the clusters are essentially free from crystalline structure *after milling* (emphasis added). The claims do not require that there is crystallinity after milling, only after heating. It appears that at least one crystalline phase is formed from heating as the temperature is substantially similar (800°C) and that a crystallinity index of 0.099 is within the scope of these respective disclosures.

Additionally, “essentially no crystallinity” is not the absence of crystallinity. It appears that Zhang and Windisch allow for the formation of at least one crystalline phase as described above.

Applicant argues that the surface area and the porosity of the filler according to the present invention was found to decrease with heating, while the surface area and the porosity of the filler according to Windisch/Zhang was found to increase with heating is evidence of the unpredictability of heat treatments of different silica materials.

However, it appears that a crystal phase is formed, as described above. Surface area and porosity of applicant's filler is a feature that is not claimed. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., surface area and porosity of the filler) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant argues that the average cluster size of the clusters is 1000 nanometers.

However, the clusters of Windisch include sizes of less than 2000. This size range includes sizes of 400 nanometers.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 54 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The recitation in claim 54, lines 5-6 of “and mixtures thereof” does not appear to have support in the specification. It is requested that applicant point to support for this recitation.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 37-39, 41-43, 47-56, 58, 59, 63, 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang ‘981.

Zhang teaches a dental material having silica particles less than 100 nm (Col. 5) which is surface treated with a silane (Col. 6, lines 1-19) and which may have additional ceramic filler (Col. 7, lines 4-10) as well as opacifying oxides (Col. 6, line 38 to Col. 7, line 3) wherein the silica comprises fumed silica (col. 5) including a hardenable resin (col. 2).

Zhang teaches a method of heating a silica sol in accordance with the invention, which includes heating a silica sol at a temperature of 600°C (col. 14, lines 57-60, heating step as taught in 09/428,830 (page 30, lines 10-15 of specification) incorporated into Zhang by reference, col. 15, lines 1-5, the clusters are made up of silica sols).

Based on the size of the silica particles and the recitation that the particles occur in clusters and that Zhang teaches using the silica product for dental materials (col. 3, lines 25-35), one of ordinary skill would recognize an optimum size of a cluster.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the size of the clusters, since it has been held that discovering an optimum value or a result effective variable involved only routine skill in the art. In re Boesch, 617 F.2nd 272, 205 USPQ 215 (CCPA 1980). The artisan would have been motivated to optimize the size of the clusters by the reasoned explanation that an optimum size of clusters can be found through routine experimentation based on the use of the silica product for dental materials (col. 3, lines 25-35) one as taught by Zhang.

Additionally, one of ordinary skill in the art would recognize that in forming clusters, chains would inherently be formed in the cluster making process (Fig. 1).

Additionally, it appears that Zhang contemplates a cluster (which meets the limitation of chains, as described above) that exhibits a crystallinity index of less than 0.1 on a scale of 0.0-1.0 (Zhang, col. 14, lines 31-43). It appears that a crystallinity index of 0.099 is within the scope of these respective disclosures. Therefore, it appears that at least one crystalline phase is formed in the clusters of Zhang.

Regarding claim 47, it appears that Zhang teaches a cluster that has crystallinity such that x-ray diffraction of the material in Zhang would inherently exhibit crystalline peaks. The limitation of an X-ray diffraction pattern of material formed after drying showing only amorphous peaks appears to be drawn to an intermediate product and lends a patentable distinction to the claims insomuch as the limitation imparts a structural difference to the final product.

Regarding claim 48, the claim recites a filler made by a method such that the method limitations lend distinction over the prior art in so far that the method limitations lend structure to the end product of the filler. The claim, therefore, requires silica nanoparticles in form of chains. Additionally, it appears that sol that is dried would not be in an aqueous solution as the aqueous solution would have been evaporated by the drying.

It appears that the instantly claimed product by process is the same as that which is claimed (silica filler in the form of chains). When the examiner has found a substantially similar product as in the applied prior art, the burden of proof is shifted to the applicant to establish that their product is patentably distinct and not the examiner to show the same process as making. *In re Brown*. 173 USPQ 685 and *In re Fessman*, 180 USPQ 324.

Regarding claims 49, 50, the clusters according to Zhang include zirconia (zirconia acts as an opacifying oxide and a microparticulate filler, col. 7)

Zhang teaches a filler as described above in claim 37.

Zhang fails to teach a zirconia filler having a size of 0.1 micrometers.

Zhang, however, teaches a zirconia filler having a size of less than 0.1 micrometers (col. 7).

Therefore, the prior art range is so close that one skilled in the art would have expected it to have the same properties. *Titanium Metals Corp. v. Banner,* 227 USPQ 773.

Regarding claims 53-54, Zhang teaches that the filler is zirconia.

Regarding claim 55, it appears that the heating is sufficient to form nanoparticulate silica fused on the microparticulate ceramic as Zhang/Windisch teach a heating temperature of 800°C as described above.

Regarding claim 56, it appears that the instantly claimed product by process is the same as that which is claimed (filler comprising silica fused on zirconia). When the examiner has found a substantially similar product as in the applied prior art, the burden of proof is shifted to the applicant to establish that their product is patentably distinct and not the examiner to show the same process as making. *In re Brown*. 173 USPQ 685 and *In re Fessman*, 180 USPQ 324.

Regarding claims 58, 59; the clusters according to Zhang include zirconia (zirconia acts as an opacifying oxide and a microparticulate filler, col. 7)

Claims 44-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang ‘981 as applied to claim 38 above, and further in view of Bullock ‘911.

Zhang teaches the dental material as described with respect to claim 38 above which is surface treated with a silane (Col. 6, lines 1-19) and which may have additional ceramic filler (Col. 7, lines 4-10) as well as opacifying oxides (Col. 6, line 38 to Col. 7, line 3).

Zhang does not teach the three specific silanes of claim 44.

Bullock teaches a dental filler material is treated with a silane which can be γ-mercatopropyltrimethoxysilane or γ-aminopropyltriethoxysilane (Cols. 4-5, lines 62-2).

It would have been obvious to modify the silane surface treatment of Zhang by using the silane surface treating agents as taught by Bullock because the teachings in each reference would lead one of ordinary skill in the art to believe that they are roughly equivalents, used on similar materials for similar effect on products having a similar end use; the silanes of Bullock achieve the purpose of the silanes of Zhang.

Claims 55, 56, and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang ‘981 in view of McCardle et al. (US 6620214).

Zhang teaches a filler as described above in claim 37.

Zhang fails to teach the proportions of 40-90 percent by weight of silica and 1-20 percent by weight of microparticulate filter.

McCardle, however, teaches a method of making a ceramic binder useful in the dental art (col. 1, 18) wherein the percent weight of ceramic binder is 11-63% (borosilicate glass is ceramic binder, col. 6, 13) and the percent weight of solid particulates is 29-81% (silica is a solid particulate, col. 8, 13)

As McCardle teaches that it is known to use a filler composition of percent weight of ceramic binder is 11-63% (borosilicate glass is ceramic binder, col. 6, 13) and the percent weight of solid particulates is 29-81% (silica is a solid particulate, col. 8, 13) useful in the dental art, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to use a filler composition of percent weight of ceramic binder is 11-63% (borosilicate glass is ceramic binder, col. 6, 13) and the percent weight of solid particulates is 29-81% (silica is a solid particulate, col. 8, 13) in Zhang.

Additionally, McCardle teaches precursor materials should be sufficiently bound together for the purpose of increasing crush strength (this appears to teach fusion of particles, col. 16).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant’s invention was made to provide the precursor materials of Zhang bound (this appears to teach fusion of particles, col. 16) together in order to increase crush strength as taught by McCardle.

Regarding claim 56, it appears that the instantly claimed product by process is the same as that which is claimed (filler comprising silica fused on zirconia). When the examiner has found a substantially similar product as in the applied prior art, the burden of proof is shifted to the applicant to establish that their product is patentably distinct and not the examiner to show the same process as making. *In re Brown*. 173 USPQ 685 and *In re Fessman*, 180 USPQ 324.

Claims 60 and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang ‘981 in view of Windisch et al. (US 6730156).

Zhang teaches a filler as described above in claim 37.

Zhang fails to teach pulverizing the calcined filler.

Windisch, however, teaches pulverizing a calcined material for the purpose of obtaining a particle size of less than 2 micrometers (col. 20).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide pulverizing the filler of Zhang in order to obtain a particle size of less than 2 micrometers (col. 20) as taught by Windisch.

While Windisch is silent regarding as to providing the silane treatment after pulverization or milling, one of ordinary skill in the art would recognize the advantages of providing silane surface treatment after milling, specifically the advantage of increased surface area, and therefore more surface area to be treated with the silane surface treatment, after milling.

Claim 62 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang ‘981 in view of Wankine (US 5276068).

Zhang teaches a filler as described above in claim 37.

Zhang fails to teach that the microparticulate filler is barium borosilicate glass.

Wankine, however, teaches a dental composition (col. 1) wherein it is known to use barium borosilicate glass as a filler (col. 10).

Therefore, it would have been obvious to one of ordinary skill in the art a the time applicant’s invention was made to provide barium borosilicate glass in Zhang in order to provide a known filler in the dental composition art (col. 10).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PAUL A. WARTALOWICZ whose telephone number is (571)272-5957. The examiner can normally be reached on 8:30-6 M-Th and 8:30-5 on Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Paul Wartalowicz
July 2, 2009

/Stanley Silverman/
Supervisory Patent Examiner, AU 1793